Software and Societal Systems Department /
School of Computer Science

Graduate Student Handbook
Academic Year 2023-2024

Software Engineering Ph.D.

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Welcome

Welcome to the Software Engineering Ph.D. Program!

Software Engineering is the branch of computer science that creates practical, cost-effective solutions to computing and information processing problems, preferentially by applying scientific knowledge, developing software systems in the service of mankind.[1] Carnegie Mellon's Software Engineering Ph.D. program produces graduates who are well-prepared for faculty positions in software engineering, for research positions in industrial laboratories, and for leadership positions in development within the software field. The Ph.D. degree is a certification by the faculty that the student has a broad education in Software Engineering and has performed a substantial piece of original research in the area.

This document is an informal description of the Software Engineering Ph.D. program; herein "we" refers to all the faculty and staff involved in the Ph.D. program. Currently, the Department head is Jim Herbsleb, jdh@cs.cmu.edu the director of Software Engineering Ph.D. program is Christian Kästner, ckaestne@andrew.cmu.edu and the Ph.D. Programs Manager is Connie Herold, cherold@andrew.cmu.ed

To complete the Ph.D. degree, we require that each student:

- Contribute to scientific knowledge in software engineering by engaging in *directed research*. This is the central element of the Ph.D. program, and students should spend at least half their time on research from the first semester onward.
- Develop a broad foundation in software engineering and specific intellectual skills by passing 84 university units worth of *graduate courses*, with certain distribution requirements
- Acquire and demonstrate teaching skills by serving as *a teaching assistant* at least twice
- Acquire and demonstrate oral and written *communication skills* by writing about research and participating in S3D's Software Research Seminar
- Demonstrate, through an issue-focused oral presentation and written *practicum report*, an understanding of software engineering that is grounded in practice.
- Write and orally defend a *thesis,* a significant piece of original research related to software engineering. To support effective planning and ensure that the student's thesis topic is viable, we require them to present a *thesis proposal* in advance.

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[1] Mary Shaw (editor). *Software Engineering for the 21st Century: A Basis for Rethinking the Curriculum.* CMU-ISRI-05-108. Carnegie Mellon University. 2005

Vision, Mission & Philosophy

Vision

Carnegie Mellon University will have a transformative impact on society through continual innovation in education, research, creativity, and entrepreneurship.

Mission

To create a transformative educational experience for students focused on deep disciplinary knowledge; problem solving; leadership, communication, and interpersonal skills; and personal health and well-being.

To cultivate a transformative university community committed to (a) attracting and retaining diverse, world-class talent; (b) creating a collaborative environment open to the free exchange of ideas, where research, creativity, innovation, and entrepreneurship can flourish; and (c) ensuring individuals can achieve their full potential.

To impact society in a transformative way — regionally, nationally, and globally — by engaging with partners outside the traditional borders of the university campus.

Philosophy

A distinguishing characteristic of our program is that we encourage and expect students to engage in research from their first day. The program is also noted for the unique background of its student community. Many of our students bring significant prior experience in industry that we value, and which they can leverage in their research—while other students may not have this experience themselves but benefit from those who do. Our community in the Software and Societal Systems department is also part of the larger community in the School of Computer Science and in the university at large; Appendix C of this document describes university-level resources that may be useful to students.

To help students fulfill the requirements of our program, we provide these educational opportunities:

- An active research environment, with experienced and dedicated faculty advisors
- Many graduate courses covering various topics within software engineering and related areas in computer science.

The entire faculty meet twice a year to evaluate each student's progress. A student demonstrates progress by passing courses, doing directed research, teaching, fulfilling the skills and practicum requirements, and doing thesis work. Because each student's path is different, the order in which students complete the various aspects of the program will vary, though directed research progress is expected every semester. A timeline showing how a typical student in our program might go through the program elements is available in Appendix A.

Outcomes

A Ph.D. is a research degree. Accordingly, its desired outcomes focus primarily on capabilities in research and education, together with expectations of capabilities in the subject area of software design and development; we therefore assume some level of the subject area capability in our entering students.

This differs from undergraduate and professional master's programs, which focus on proficiency in software design and development. In particular, we expect that the following will be outcomes of the Ph.D. program:

- **Ability to do independent research**. SE Ph.D.'s must have the ability to carry out independent research – to select significant practical problems, solve them in creative ways, evaluate them critically, demonstrate the validity of the solution, and gather the resources to carry out the work. This is the absolutely essential capability of a Ph.D.
- **Skill in several research methods**. SE Ph.D.'s will have broad knowledge with the research methods of the field, empirical and formal (symbolic) methods, together with the ability to evaluate the application of a research method and to select the appropriate research method for a specific research project.
- **Depth of knowledge in chosen specialty**. SE Ph.D.'s are deeply knowledgeable in their specialties. Within their specialties they can evaluate and critique material. They exercise this knowledge both within the discipline and in the public realm.
- **Broad general knowledge of SE**. SE Ph.D.'s are broadly knowledgeable in their field. They have software design and development skills, and they are familiar with issues in computer science at large. They exercise this knowledge both within the discipline and in the public realm, and they seek relevant knowledge from other fields.
- **Ability to teach a range of software courses**. SE Ph.D.'s will be technical leaders. As such, they will be able to organize a body of knowledge so it can be taught to others and should be able to plan presentations and other activities to teach that material. This requires communication with non-experts as well as experts.
- **Communication skills**. SE Ph.D.'s will be able to communicate effectively about technical material both within and outside of their specialization, both to other researchers and also to policy makers and the public.
- **Deep understanding of practical software issues**. SE Ph.D.'s will ground their research in a deep understanding of software engineering practice. In addition to basic software design and development skills, they will have an in-depth understanding, drawn from personal observation, of practical software engineering issues. These include the implications of development at scale, the gnarly engineering tradeoffs and conflicts that arise in practice, and the tangle of technical, business, and often policy issues that are imposed by project context.
- **Broad, mature, multidisciplinary perspective.** SE Ph.D.'s will be prepared for interdisciplinary collaboration and professional leadership. This depends on their ability to view SE critically; to understand how software-intensive systems interact with larger issues in society, business, socio-economic impacts, and public policy; and to appreciate the

perspective of both collaborators and competitors.

A table relating the outcomes above to the program requirements is provided in Appendix B.

Ph.D. Community

We are committed to a strong sense of community within the S3D as well as the School of Computer Science as a whole. Our community is one of the reasons many students choose to come here. We foster community spirit through close working relationships between students and advisors, among faculty, and among students. Many working relationships turn into friendships for life.

In practice, our students, faculty, and staff volunteer their time, energy, intellect, talent, and other skills to do many of the things that keep our environment running smoothly. These efforts include organizing seminars, serving on departmental committees, grading for graduate courses, planning, and running social activities, giving tours, and hosting visitors. Our Software Engineering Ph.D. students have an impressive record of volunteer leadership not just within the program, but also at SCS and university levels.

Student Leadership

An important part of our culture is that students have a voice and a vote in decisions about the Ph.D. community. In general, decisions regarding Ph.D. program policies are made by a Software Engineering Leadership committee. The committee is composed of software engineering faculty as well as two Ph.D. student representatives who serve staggered 2-year terms. Decisions in the committee are nearly always made by consensus, but the student representatives are voting members of the committee when consensus is unclear.

Mutual Respect

An essential aspect of our culture is mutual respect among students, faculty, and staff that are highly diverse, not only in terms of professional and research interests, but also in terms of gender, national origin, religion, sexual orientation, and other demographic characteristics. Words or actions that express discrimination, disrespect, intimidation, or harassment based on race, color, national origin, birth sex, gender identity, handicap or disability, age, sexual orientation, religion, creed, ancestry, belief, veteran status, or genetic information are not acceptable within our community. Any violations of these standards should be brought to the Ph.D. program director, Christian Kästner, Ph.D. Coordinator, Connie Herold, the ombudsperson for the program or the Office of Student Affairs.

Incidents of Discrimination or Harassment

Our community places great value on mutual respect. However, if you witness an incident of discrimination based on gender, race, religion, or similar characteristics; it is important to know what to do about it.

If you feel comfortable and safe responding to the discriminatory behavior in the moment, we encourage you to do that; such responses, especially from bystanders, reinforce our community standards and can start an educational dialog that leads to reconciliation and prevent similar incidents from occurring in the future.

We encourage you to talk with the Ph.D. program director, any faculty member, the student ombudsperson(s), the Ph.D. program coordinator, or someone in the Office of Student Affairs about any incidents you witness or hear about secondhand. Faculty members, student ombudspersons, and the Ph.D. program coordinator are responsible for forwarding such incidents to the Ph.D. program director (or, when the director has a conflict, to the faculty ombudsperson) for follow-up.

There are a wide range of behaviors that may be concerning; we can help you talk through them and then investigate to come to an understanding of whether there is a violation of community standards. If there is a violation, we will take it seriously and will take action according to the severity of the incident.

One-time incidents that are not very severe may be handled by a conversation with the individual engaged in the problematic behavior. Here, the primary goal is education about our community expectations, a discussion of how to ameliorate the damage caused by the discriminatory incident, and an understanding of the consequences if violations of community standards were to continue.

Individual or repeated incidents that are severe enough to have a significant negative impact on an individual or on our community will be reported to the Office of Student Affairs or the Office of Title IX Initiatives, which have a processor dealing with them. These more serious incidents, when perpetrated by a student, will also be discussed at Black Friday, where consequences maybe imposed such as required amelioration actions, an N-1 letter, or termination from the program.

Degrees Offered

Software Engineering Degree

The degree that is offered in the program is "Software Engineering Ph.D. Degree"

Dual Degree with Portugal

The Software and Societal System Department (S3D) offers a dual degree Ph.D.in Software Engineering in cooperation with several Portuguese universities. The regulations are essentially the same as given in this document, except that some requirements can be fulfilled in an affiliated program in Portugal.

The Dual Degree Program is based on a matching of requirements of both the Carnegie Mellon and the partner institutions PhD Programs. Each student will be co-advised by a S3D-SE/Carnegie Mellon faculty member and a faculty member of the Portuguese Institution.

The student is expected to spend two years at S3D/Carnegie Mellon. In this period, the student shall take star courses (as specified by Carnegie Mellon/S3D SE regulations) and start working on research.

The second period, whose duration is to be determined by the co-advisors but is expected to last typically three years, will be hosted by the partner institution in Portugal, where the student is expected to continue with the research work. The research work will take place in the context of collaborative research activities between partner institution and Carnegie Mellon.

The remaining time until completion of the thesis shall be divided between research stays at SE-S3D/Carnegie Mellon and the Portuguese Institution. The schedule should be flexible to fit the needs of the doctoral research project.

By the end of the third or the fourth year the student must present the thesis proposal formally at S3D SE/Carnegie Mellon or at the partner institution in Portugal. The Portuguese co-advisor should attend the oral presentation and discussion of the Thesis Proposal at S3D SE/Carnegie Mellon or via videoconference.

The public oral thesis defense will take place either at Carnegie Mellon or at the Portuguese Institution, according to the rules of the SE PhD program. The thesis evaluation committee must include both the Carnegie Mellon and the Portuguese co-advisors, members of the advisory committee, and external reviewers

Courses

Students may count up to (2) courses from their Master's degree as part of their Ph.D. degree.

Student may petition the program for approval for (1) Portugal class to be counted as part of the

Star category, and (1) class to be counted as part of the elective category. This process is found under Petition for Star Course in this handbook.

Practicum/Writing Requirements, Student may complete both in Portugal with the completion of paperwork used in Pittsburgh.

Speaking skill, will be approved based on the students time here by participating in the SSSG.

T/A skills, students may complete one in Pittsburgh and one in Portugal. If one is completed in Portugal student must have the TA form used in Pittsburgh filled out and returned by the Portugal teaching faculty member.

Carnegie Mellon University Statement of Assurance

Carnegie Mellon University does not discriminate in admission, employment or administration of its programs or activities on the basis of race, color, national origin, sex, handicap or disability, age, sexual orientation, gender identity, religion, creed, ancestry, belief, veteran status, or genetic information. Furthermore, Carnegie Mellon University does not discriminate and is required not to discriminate in violation of federal, state or local laws or executive orders.

Inquiries concerning the application of and compliance with this statement should be directed to the university ombudsperson, Carnegie Mellon University, 5000 Forbes Avenue, Pittsburgh, PA 15213, telephone 412-268-1018. Obtain general information about Carnegie Mellon University by calling 412-268-2000.

Carnegie Mellon University publishes an annual campus security and fire safety report describing the university's security, alcohol and drug, sexual assault, and fire safety policies, and containing statistics about the number and type of crimes committed on the campus, and the number and cause of fires in campus residence facilities during the preceding three years. You can obtain a copy by contacting the Carnegie Mellon Police Department at 412-268-2323. The annual security and fire safety report also is available online at www.cmu.edu/police/annualreports.

Information regarding the applicable grievance procedures for alleged violations of the Statement of Assurance is available at
https://www.cmu.edu/policies/forms-and-documents/soa-violations.pdf.

The Office for Institutional Equity and Title IX may be reached at 412-268-7125
or institutionalequity@cmu.edu.

The Carnegie Mellon Code

Students at Carnegie Mellon, because they are members of an academic community dedicated to the achievement of excellence, are expected to meet the highest standards of personal, ethical,

and moral conduct possible.

These standards require personal integrity, a commitment to honesty without compromise, as well as truth without equivocation and a willingness to place the good of the community above the good of the self. Obligations once undertaken must be met, commitments kept.
As members of the Carnegie Mellon community, individuals are expected to uphold the standards of the community in addition to holding others accountable for said standards. It is rare that the life of a student in an academic community can be so private that it will not affect the community as a whole or that the above standards do not apply.

The discovery, advancement and communication of knowledge are not possible without a commitment to these standards. Creativity cannot exist without acknowledgment of the creativity of others. New knowledge cannot be developed without credit for prior knowledge. Without the ability to trust that these principles will be observed, an academic community cannot exist.

The commitment of its faculty, staff and students to these standards contributes to the high respect in which the Carnegie Mellon degree is held. Students must not destroy that respect by their failure to meet these standards. Students who cannot meet them should voluntarily withdraw from the university.

The Carnegie Mellon Code can also be found on-line at:
https://www.cmu.edu/student-affairs/theword/

University Policies & Expectations

It is the responsibility of each member of the Carnegie Mellon community to be familiar with university policies and guidelines. In addition to this departmental graduate student handbook the following resources are available to assist you in understanding community expectations:

The Word/Student Handbook:
https://www.cmu.edu/student-affairs/theword/

Academic Integrity Policy:
https://https://www.cmu.edu/policies/student-and-student-life/academic-integrity.html

University Policies Website:
https://www.cmu.edu/policies/

Office of Graduate and Postdoctoral Affairs:
https://www.cmu.edu/graduate/policies/index.html

Due to the changing nature of conditions and expectations surrounding public health and safety requirements please visit:

https://www.cmu.edu/coronavirus/
for the most up to date information.

Please see **Appendix A** for additional information about The Word and University resources.

Academic Calendar

The Academic Calendar can be found at:
https://www.cmu.edu/hub/calendar/index.html

It provides information on all deadlines including registration dates, class start dates, add/drop deadlines, exam dates and more.

Faculty and Student Ombudspersons

Faculty and Student Ombudspersons

If a student feels that none of the above avenues are appropriate for addressing his or her problem, the student can turn to the Ph.D. program's student or faculty ombudspersons.

Currently, the faculty ombudsperson is **Mayank Goel.** The faculty ombudsperson's roles and responsibilities are:

- To meet with students and listen to their problems
- To give advice, perhaps suggesting someone else to talk to or suggesting the next step to take
- To take action on any issues where the program director may be conflicted
- To keep conversations confidential

Currently, the student ombudsperson is [currently vacant]. The student ombudsperson's roles and responsibilities are:

- To meet with other students and listen to their problems
- At the student's request, to refer issues to the SE Ph.D. program director, or to the faculty ombudsperson in any case where the program director may be conflicted. If both are conflicted, the ombudsperson can assist the student with referring the issue to the Dean of Students.
- To keep conversations confidential

Doctoral Degree Completion and Certification

Standard Degree Requirements & Degree Certification

Graduate Students
Carnegie Mellon graduate students are expected to complete their degree requirements within the standard length of time for their program of study as outlined in the relevant Graduate Student Handbook. Standard program lengths for graduate students vary significantly – ranging from two semesters for some full-time master's programs to several or more years for doctoral programs.
Upon completion of the graduate program degree requirements, the degree will be certified by the student's academic program in the semester in which the student completes the requirements.

Early Completion
Graduate students who consider the completion of all degree requirements in less than the standard length of time for their program of study may consult with their degree-granting program or department to determine if early degree certification is allowed under what circumstances.

Extended or Longer-than-Standard Completion:
Longer-than-standard degree completion may occur due to academic interruptions in making progress toward the degree as defined by the academic program, interruptions of full-time study or progress towards the degree due to serious, documented medical issues, or other unusual or unforeseen circumstances.

Doctoral students who require an extended period to complete their degree requirements must consult with their academic program, and are subject to the CMU Policy on Doctoral Student Status (https://www.cmu.edu/policies/student-and-student-life/doctoral-student-status.html. html), specifically the "Time to Degree" section.

Additional Guidance for Students

Program of Study
Students seeking guidance about their program of study and degree requirements should consult with their academic advisor and/or appropriate associate dean.

International Students
Immigration status for students in F-1 and J-1 non-immigrant status is tied to making normal progress toward completing degree requirements. Therefore, F-1 and J-1 students who are considering completing their degree requirements early, anticipating longer-than-standard completion, or moving from an undergraduate to a graduate student classification (integrated undergraduate-graduate study) should consult with their designated advisor in the Office of International Education (OIE) to ensure compliance with immigration regulations.

Statute of Limitations

As outlined in the Doctoral Student Status Policy:

https://www.cmu.edu/policies/student-and-student-life/doctoral-student-status.html

Students will complete all requirements for the Ph.D. degree within a maximum of ten years from original matriculation as a doctoral student. Once this time-to-degree limit has lapsed, the person may resume work towards a doctoral degree only if newly admitted to a currently offered doctoral degree program under criteria determined by the program.

Under extraordinary circumstances, such as leave of absence, military or public service, family or parental leave, or temporary disability, a school or college may, upon the relevant department's recommendation and with the written approval of the dean, defer the lapse of All but Dissertation status for a period commensurate with the duration of that interruption.

Time spent in leaves of absence or in absentia counts towards the time limits above.

S3D expects all doctoral students to complete their degree within the University limits of a maximum of 10 years.

Residency Requirements and Expected Timeline

Ph.D. students must register as a full-time student for a minimum of 2 academic years in total. Full-time students must be resident in Pittsburgh, or with the approval of their advisor and the program head, at a collaborative site.

Registration Process/Procedures

All students are fully responsible to register for their courses in the Fall and Spring. Students are expected to carry 48 units. Students can adjust their Reading and Research units (Course 17-997 to achieve the 48 units).

Summer registration will be done by the program coordinator and will be based on the students response to the Summer Plans form that will be sent in early spring. The deadline for summer plans is May 1st.

Doctoral Degree Requirements and Related Policies/Protocols

The purpose of completing graduate courses at Carnegie Mellon University is to attain a broad understanding of software engineering and closely related fields, a core set of research skills, and a deep understanding of topics that lead into the student's thesis research.

Our requirement is that students **complete 84 university** units, which is the equivalent of 7 standard 12-unit courses.

Our core research course, 17-808, provides an understanding of the Software Engineering field, including important ideas and the major research strategies in use. Certain courses are designated as 'star' courses because they provide a solid foundation in some area. By taking a star course in each of the four categories, students acquire breadth through exposure to fundamental knowledge, concepts, and skills in software engineering. Through the equivalent of two elective courses, students typically choose to gain more depth in the student's particular area of research.

Some students use electives to gain more breadth by specialized exposure to an area outside of the student's core research area.

Core Course Software Engineering Research 17-808

The Software Engineering Research Course requirement is fulfilled by taking the 12-unit course 17-808*: Software Engineering Research*, typically in their first semester in the software engineering Ph.D. program. Our core research course, 17-808, provides an understanding of the Software Engineering field, including important ideas and the major research strategies in use.

This course is taught jointly by the software engineering faculty and is designed to prepare Ph.D. students to do research in software engineering. It introduces important ideas across the breadth of software engineering and the major research strategies of the field. Students will become familiar with the structure of the field; they will learn the seminal ideas and developments that led to current research questions; they will learn to critique research papers to evaluate their claims and evidence; and they will also become familiar with the current software engineering research themes at CMU.

Star Courses: Four Areas

Each student must pass one-star course from each of four categories:

- SYM: Symbolic mathematical modeling and analysis
- BEH: Human-focused empirical research
- ENG: Design and engineering of software systems
- SOC: The interaction of software with larger issues in society, business, or public policy.

These categories are chosen to ensure that students acquire breadth through exposure to fundamental knowledge, concepts, and skills in software engineering. Each category captures a particular set of knowledge and skills that every software engineering student should possess. At the same time, the choice of courses within the categories gives students the flexibility to customize their course selection to their individual needs.

Star courses are identified as especially appropriate to provide grounding in a topical area or set of research skills within Software Engineering. The criteria for a star course include:

- They provide a broad introduction to a topic or skills relevant to software engineering research, while being deep enough to be appropriate for Ph.D. studies.
- They assume only an undergraduate background in the relevant area.
- They use multiple forms of evaluation, such as assignments, exams, projects, or term papers.

Approved Star Courses

The more detailed descriptions of the star course categories, together with the rationale for their selection and the currently approved courses in each category, are listed below. For requesting the approval of additional courses as star courses see Section 15 Petition Procedures for Requesting New Star Course.

SYM:

A course whose primary focus is on symbolic mathematical modeling and analysis techniques that are applicable to software artifacts. Students taking a SYM course should engage in symbolic research methods that might include discrete models, proofs, state space exploration, or other software-relevant mathematical topics. Symbolic mathematical techniques are useful in many areas of software engineering research, and more broadly, many students have found them helpful in writing careful definitions and precisely distinguishing among related concepts. The courses currently approved in this category are:

- 10-701 Machine Learning (Ph.D.-level)
- 10-715 Advanced Introduction to Machine Learning
- 10-725 Convex Optimization
- 11-727 Computational Semantics for NLP
- 15-812 Programming Language Semantics
- 15-814 Types and Programming Languages
- 15-816 Advanced Topics in Logic: Automated Reasoning and Satisfiability
- 17-714 Formal Methods AND
- 17-724 Advanced Formal Methods†
- 17-819 Program Analysis
- 80-610 Formal Logic

ENG:

A course with a primary focus on software systems design and engineering. Courses in this category must include (A) significant engagement with software design, (B) consideration of software artifacts at a significant scale and complexity, and (C) exposure to the tradeoffs (such as cost/benefit) at the core of the engineering discipline. The courses currently approved in this category are:

- 05-631 Software Structures for User Interfaces
- 05-830 Advanced User Interface Software
- 10-714 Deep Learning Systems
- 15-640 Distributed Systems
- 15-712 Advanced Operating Systems and Distributed Systems
- 15-745 Optimizing Compilers for Modern Architectures
- 15-821 Mobile and Pervasive Computing
- 15-829 Programmable Networks
- 17-626 Requirements for Information Systems†
- 17-700 Data Science and Machine Learning at Scale
- 17-712 Fantastic Bugs and How to Find Them
- 17-745 Machine Learning in Production
- 17-766 Software Engineering for Startups
- 17-722 User Focused Sensing Systems
- 17-770 Virtual Machines and Managed Runtimes
- 17-882 Software Architectures†
- 18-730 Introduction to Computer Security
- 18-732 Secure Software Systems
- 18-749 Building Reliable Distributed Systems

SOC:

A course with a primary focus on how technology interacts with larger issues in society, business, or public policy. This requirement is intended to create breadth in the curriculum, pushing students out of a focus on the software system itself (which is what ENG does). Suitable courses are commonly found outside of the school of computer science, but can also be found within the school, for example HCI or robotics courses strongly rooted in psychology. At least half of the course content, including some evaluations, should go beyond technical implementation and algorithmic concerns. The courses currently approved in this category are:

- 05-618 Human-AI Interaction
- 05-813 Human Factors†
- 05-820 Social Web
- 05-899 Fairness, Accountability, Transparency, & Ethics (FATE) in Sociotechnical Systems ‡ **
- 08-631/17-631 Information Security and Privacy
- 08-805/17-735 Privacy Engineering

- 10-713 Machine Learning, Ethics and Society
- 16-735 Ethics and Robotics
- 16-867 Principles of Human-Robot Interaction
- 17-668 Network Analysis
- 17-731/18-734 Foundations of Privacy
- 17-733 Privacy Policy, Law and Technology
- 19-758 Special Topics: Organizational Theory for Engineers
- 90-802 Information Security: Comparison of US and European Policies
- 90-880 Strategy and Management of Technological Innovation

BEH:

A course that is primarily concerned with behavioral science research methods and research study designs. The course must cover one or more human-focused empirical research methods for data collection and data analysis in depth. These methods may involve working with subjects directly or inferring information about subjects based on artifacts they have left behind, as in mining software repositories research. Common examples include case studies, interviews, surveys, human subjects' experiments, or various forms of statistical analysis. The course must also discuss higher-level study design issues that expose students to the inherent strengths and weaknesses of different research methods applied in different contexts for answering different types of research questions. Finally, the course must require students to plan and prototype a sample project using at least one of these research methods in some depth.

- 05-748 Research Methods for the Learning Sciences**
- 05-816 Applied Research Methods
- 05-823 E-Learning Design Principles and Methods
- 05-899 Human Aspects of Software Development ‡ **
- 17-734 Usable Privacy and Security
- 17-803 Empirical Methods
- 36-743 Statistical Methods for the Behavioral and Social Sciences **

** Not offered regularly
† These courses are approved even though they are 6 or 9 units only under the condition that they are complemented with an independent study for the remaining 6 or 3 units. The independent study is to be arranged with the course instructor and will typically focus on a research project related to the course content.
‡ HCI recycles their course numbers for special topics courses, make sure that the title matches.

Electives- 24 Units Required

Students must take 24 university units worth of elective courses. In general, elective graduate courses must be relevant to the software engineering degree and must be Ph.D. level (University course numbering 700 and above); exceptions to the latter rule may be made with a note from the student's advisor to the SE Ph.D. Program Administrator.

Through the equivalent of two elective courses students may use electives to gain additional depth of knowledge in the student's research area, e.g., to complement their directed research or to prepare them for choosing a thesis topic. Students may also use electives to gain additional breadth of knowledge in an area outside of the students research area.

We strongly advise students to choose electives in consultation with their advisors. The student and their advisor are both responsible for making sure that through these 24 elective units the student gains new knowledge, perhaps to fill gaps or prepare for thesis research. Students are free to take more than the required number of elective units. The following is a sample of past electives taken.

- 05-830 Advanced User Interface Software
- 05-899D Human Aspects of Software Development
- 15-816 Modal Logic
- 15-819 Advanced Topics in Programming Language

Software Engineering Research Seminar

All SE Ph.D. students are expected actively participate in the weekly Software Engineering Research Seminar (SSSG) each semester. This seminar is an opportunity to learn about Software Engineering research in the department and to gain presentation skills. Each student is expected to present twice per year in the seminar.

If the student presents in another academic venue, the requirement is reduced to one talk per year. The outside presentation can come in many forms and should be research-related or teaching-related, such as (a) presenting research at an external workshop, seminar, or conference, (b) giving a guest lecture in a course, and (c) a practice talk given to a research group. Presentations given as part of required coursework or required TAing duties do not qualify. It is expected that the outside presentation is nontrivially different from the SSSG presentation, at a minimum a substantially revised version of a practice talk.

Typically, at least one SSSG presentation per year should be related to the student's recent, current, or future research.

If during the doctoral review meeting, it is determined that a student has not met these requirements, the student will be asked to schedule additional presentations in SSSG to make up for the difference in the next year.

A student who has a course conflict with SSSG should get approval from their advisor and the SE Ph.D. Program Director; approval is routinely granted but is expected to be rare (typically once or twice in a student's time in the program).

This seminar is typically held on Mondays between 3:30-5:00 during the semester in TCS 358.

Written and Oral Communications Skills

To be a well-rounded software engineer, each student should have not just basic knowledge, but also the abilities:

- To communicate technical ideas clearly in writing
- To communicate technical ideas clearly orally

We also expect students to be able to program, but there is no formal checkpoint to certify programming skills. It is left up to the advisor and student to make sure the student has the necessary skills.

Writing Proficiency

To satisfy the writing proficiency requirement, each student must write a scholarly document, as either its sole author or its primary author (if co-authored), that is at least the quality of a Carnegie Mellon technical report. This document must be a scholarly paper with references to the literature that could be submitted for peer review. It may be a technical report, a paper published at or in preparation for a conference or journal, a document written to satisfy a course requirement (e.g., a course project report), or a comprehensive survey paper (e.g., suitable for submission to ACM Computing Surveys). There is no requirement on scope or length of the paper, as long as it is a fully formed work that presents scientific results with the structure one would expect in a conference or survey paper. It is OK if the paper includes edits by other authors, as long as the student wrote the majority of the text and was involved in the editing process.

Annotated bibliographies, user manuals, and reference manuals do not qualify because they do not require the same kind of explication, organization, and summarization skills needed to write a conference- or journal-like publication. Similarly, opinion pieces, proposals, or descriptions of work in progress do not qualify. The paper may not be a practicum document, the thesis proposal, or the thesis.

The writing requirement is evaluated by at least **two faculty** members and **one S3D** Ph.D. student who has fulfilled a writing requirement. Any non-courtesy Tenure Track or Research Track faculty member in SCS may be an evaluator. In addition, faculty in other tracks, or in other schools, can serve as evaluators with permission of the SE Ph.D. Program Director, which is typically granted for faculty active in research in a relevant area. One of the reviewers must be a faculty member of S3D, and none of them should be a co-author of the paper being reviewed.

These evaluators must read the document and provide written feedback using the Writing Evaluation Form. If the initial draft is not satisfactory, the student must revise the document until the evaluators are willing to give their final approval by signing the form. The student then gives these three (or more) signed forms to the SE Ph.D. Program Administrator, who keeps copies in the student's file and indicates in the student's records that the requirement has been satisfied.

Students are responsible for asking the appropriate faculty members and Ph.D. student to help them with satisfying their writing requirement.

We expect students to be able to satisfy this requirement within their first three years, and prior to their thesis proposal.

Ph.D. students are welcome to enroll in the undergraduate communications course, required of undergraduate computer science majors, to enhance their writing skills; however, taking it is not sufficient to satisfy the written communication skills requirement.

Speaking Proficiency

At the student evaluation meeting held each semester, the faculty make a judgment to pass students who have demonstrated high speaking proficiency through the presentation(s) they have given in the Software Engineering Research Seminar and other venues. We expect a standard of proficiency typical of good presentations at an academic conference, or of a respected instructor giving course lectures.

Students who have passed the proficiency requirement still benefit from honing their speaking skills, and so they are expected to continue to attend the Seminar, including active participation and twice-yearly presentations as described in the Software Engineering Research Seminar course requirement (above).

Practicum Requirement

An integral part of S3D's software engineering research program is ongoing interaction with industrial-strength software development in a real (not just realistic) setting. Many students already have industrial experience. Those whose prior experience is insufficient may be required to acquire such experience, typically by participating in one or more industrial internships while in the program.

The purpose of the practicum, therefore, is to ground academic study in practice by careful reflection or scientific study of direct experience in software development. Each student will complete one practicum. A practicum may take one of the following forms:

1. An issue-focused reflection and analysis of a practical software engineering experience of the author.
2. An empirical study of (some aspects of) the software development process.

A practicum of the first type is similar to an experience report, such as those published in the ICSE Software Engineering in Practice track but is not expected to attain the level of polish or broad applicability that might be expected for formal publication. It is not merely a report of the author's experience. Rather, it is a critical reflection on that experience, focused on a well-defined issue or

a related set of issues. The practicum should be grounded in experience and careful observation, and possibly data as well. At the same time, it should draw out substantive lessons that might be applied to other similar situations. As an informed reflection, it should be framed in the fundamental concepts of the software engineering literature, which might explain or contradict the student's practical experience. It is not always necessary to have sufficient data for statistical validity, but in all cases the narrative should be clear about the strength of the evidence.

The second category of practicum is in the form of a scientific paper, potentially publishable at a peer-reviewed conference or workshop in the area of empirical software engineering.

Practicum Format and Evaluation

The practicum can be presented (a) orally as a talk in the Software Engineering Research Seminar (SSSG) or (b) in the written form of a report. In either format, the practicum shall be self-contained and suitable for an audience of entering software engineering PhD students or advanced undergraduates. The practicum shall be presented in a scientific style: it should have clear definitions, careful distinctions between observations and interpretation, and appropriate comparisons to the scientific literature. A typical written report would be 7-10 pages in a normal technical report format. Students may choose to develop their practicum as part of taking the course 17-415 Software Engineering Reflection. We expect a typical student will be able to prepare and practice a practicum talk or write and revise a practicum report in approximately a week of work (40 hours).

The practicum talk or report must be approved by two faculty members. Any faculty in the S3D are eligible; other faculty may be approved by the SE Ph.D. Program Director. If the practicum was written as part of taking 17-415 Software Engineering Reflection, instructor approval is sufficient without input from another faculty member. For oral presentations, the talk faculty evaluators will provide immediate feedback based on the provided rubric, for written reports the expected cycle for feedback is approximately 3 weeks.

Guidance and a rubric for evaluating the practicum is available together with past practicum reports on the internal Google drive for the SE Ph.D. Program.

Practicum and Confidentiality

As with any report on practical experience, practicum papers may be sensitive. Practicum reports must be available to members of the Carnegie Mellon Software Engineering Community without restriction; however, they need not be public beyond the scope of that community. It is the student's responsibility to ensure compliance with any NDAs the student may have signed. As with other papers, it is acceptable to shield the identity of individuals and organizations, as well as details of data about the experience (for example, by removing units from graphs).

Prior practicum reports are available on the password-protected internal SE Ph.D. Program web page, along with informal pragmatic advice on writing the practicum document.

Petition Procedures for Requesting New Star Course

The faculty have selected an initial set of approved courses in each category. These are subject to review from time to time to ensure that, if the course content changes, it remains consistent with the purpose of that star.

SE Ph.D. students may request that the faculty approve an additional course in one of the star categories. In general, if the request is approved, the course will be added to the list for other students to take for star credit. When a request is student-initiated, it is the student's responsibility to make a case supporting STAR status. Students should submit a request to the SE Ph.D. Program Director and the SE Ph.D. Program Administrator using the following template:

A. Your name
B. Name and number of the course
C. Course description or URL to course description
D. Which star requirement you want this course to satisfy
E. An indication of approval by your advisor.
F. Evidence, including quotes from the course description and syllabus with supporting links, to demonstrate that the course:
G. Matches the topic and fulfills the particular requirements of the star course category you have requested. Star courses should have some degree of breadth but are not expected to provide comprehensive coverage of a star category.
H. Assumes an undergraduate background in the relevant area–no more and no less
I. Uses multiple forms of evaluation (e.g., assignments, exams, projects, papers, …)
J. Is appropriate for Ph.D. studies in terms of depth and engagement with research. For example, if a course is primarily designed for master's students, a justification should be given that the course is also an appropriate preparation for Ph.D. studies. Sometimes a course that is missing engagement with research may be adapted for Ph.D. students through additional or replacement assignments that lead PhD students deeper into relevant research topics

Given sufficient information, requests received by the faculty should generally receive a response within 2 weeks if the request is made during a regular academic semester. Star credit should generally be requested at least **2 weeks before the end of the semester before taking** a course, and preferably 2 weeks before the beginning of the registration period. This ensures students can register for a course before it fills up and avoid spending time on a course that is not in the end approved.

Courses will not, in general, be approved in two categories, but instead will be approved in the category that best fits the primary emphasis of the course (if any). If any exception to this principle is made, the student must choose which category to apply the course to and find a different course with which to fulfill the other requirement.

There is a precedent for approving an independent study for star credit, in the rare case where an

appropriate independent study suits the student's needs better than any available course. The approval process is the same in this case, but the proposal submitted by the student should identify who would advise the independent study, what the output of the study will be and how it should be evaluated, the match to the appropriate star category, appropriateness of the course for Ph.D. study in terms of depth and engagement with research and should indicate advisor approval.

Course curricula may evolve over time, due to the advancing state of knowledge, the changing background and needs of students, or the strengths that a new instructor brings to bear on a course. Therefore, the faculty may re-examine star courses from time to time to verify the course continues to fulfill the requirements for a star. If it does not, star status may be withdrawn for future offerings of the course.

Department Policy/Process for Withdrawing from a course

Students must follow the University deadline for withdrawing from a course.

https://www.cmu.edu/hub/registrar/course-changes/index.html

Drop/Add/Withdraw Procedures

Students taking undergraduate and master's level courses must follow the procedures and deadlines for adding, dropping, or withdrawing from courses as identified on the academic calendar. Information can be found at

https://www.cmu.edu/hub/registrar/course-changes/index.html

There is a separate calendar for doctoral level courses.

Course Waiver Policy for Prior Course Work

This program does not accept transfer credit of courses taken outside of CMU. However, students may request to waive up to two course requirements based on equivalent graduate level work.

Students may request to waive up to two course requirements based on equivalent graduate-level courses they have already taken, or based on industry experience they have acquired, prior to entering the Ph.D. program. The Software Engineering Research course cannot be waived, and no more than 12 units of star courses can be waived.

To apply for a waiver, a student must submit a petition to the Ph.D. Program Coordinator **within their first year in** the program. A separate petition must be submitted for each course to be waived. The prior course need not be equivalent in content to one of the approved courses in the

same category but rather should be equivalent in substance: a student who has done excellent work in an intellectually rigorous graduate course on a computer science topic that we happen not to teach may be granted a waiver if it matches the intent of the corresponding category.

The petitioner must make a case for how prior courses are equivalent in substance, submitting a self-contained justification, a syllabus, and a transcript (translated if necessary). As needed, the petitioner can provide additional support for the case by providing slide excerpts, reading lists, homework assignments, work products, or other supporting artifacts. For star courses, the justification must argue why the course(s) match the intent and expectations of the appropriate star requirement, similar to requests for approval for a new star course (described above). To waive a course based on comparable experience, the student should document how the experience demonstrates their systematic knowledge of the relevant material.

Typically, courses may be waived based on rigorous graduate courses taken as part of a master's degree. For example, a master's level psychology course might be appropriate to fulfill the BEH star requirement, and a similar economics course might fulfill the SOC requirement. In rare cases, unusual advanced undergraduate coursework or research experience may be sufficient to waive a course, if the material covered is equivalent in substance to the star courses in question.

These petitions will be considered by the faculty, typically delegated to a faculty member with expertise in the corresponding star area. The outcome of the petition process will be decided based on provided information on the prior course and the petitioner's performance in it. The faculty may ask appropriate instructors for assistance in this decision or reject the petition with a request for resubmission if insufficient information is provided. If appropriate, the faculty may stipulate conditions on the waiver, such as preparing a supplementary project that exposes the student to software engineering research in the area of the course and is roughly equivalent in scope to a final project in a typical PhD. -level course.

Transfer Courses and Pittsburgh Council on Higher Education (PCHE)

Carnegie Mellon University offers students the opportunity to take courses for credit through a cross-registration program (see Pittsburgh Council on Higher Education (PCHE) and Cross-registration below) and through the receipt of transfer credit from other accredited institutions. The Carnegie Mellon University transcript will include information on such courses as follows: Carnegie Mellon courses and courses taken through the university's cross-registration program will have grades recorded on the transcript and be factored into the QPA. All other courses will be recorded on this transcript indicating where the course was taken, but without grades. Such courses will not be taken into account for academic actions, honors or QPA calculations.

https://www.cmu.edu/policies/student-and-student-life/doctoral-student-status.html

Protocol for evaluation of transfer credit

The Software Engineering program does not accept transfer credit.

Independent Study/Directed Reading

If you would like credit for an Independent Study and count for credit towards your Ph.D. degree courses in Software Engineering, you must fill out the SE Ph.D Independent Study Prospectus. You will need your advisors approval, and Ph.D. directors approval. Please reach out to Connie Herold, Programs Manager for the form. Students will register under **17-806** under the supervising faculty members section.

Students must request credit prior to the start of the semester of the Independent Study course.

Teaching

International Graduate students are required to have a certain level of fluency in English before they can instruct in Pennsylvania, as required by the English Fluency in Higher Education Act of 1990. Through this Act, all institutions of higher education in the state are required to evaluate and certify the English fluency of all instructional personnel, including teaching assistants and interns.

The full university policy can be reviewed at:
https://www.cmu.edu/policies/faculty/evaluation-certification-english-fluency-instructors.html

The fluency of all instructional personnel will be rated by Language Support in the Student Academic Success Center to determine at what level of responsibility the student can TA.

In addition to administering the International Teaching Assistant (ITA) Test (a mandatory screening test for any non-native speaker of English), Language Support in the Student Academic Success Center helps teaching assistants who are non-native English speakers develop fluency and cultural understanding to teach successfully at Carnegie Mellon.

Visit the Student Academic Success Center website for additional information:
https://www.cmu.edu/student-success/

Teaching Requirements

The ability to teach is an important skill for all scientists, not only for those who plan to teach after completing their degrees. Teaching skills include the ability to communicate technical material ranging from elementary to advanced, and to communicate technical material to audiences ranging from general to specialized. Thus, we expect students to develop and exercise teaching skills as part of their graduate education.

Students have ample opportunities to present advanced material while working on research projects, by participating in research seminars and by giving practice conference talks. To gain experience in presenting material at an introductory or intermediate level, we require that all graduate students help teach two courses. The norm is for students to teach one course focused on introductory material in computer science or software engineering, and one course focused on mastery of material (typically an advanced undergraduate or master's course). Teaching assistants typically spend 15-20 hours per week.

In the rare event that students desire to fulfill their teaching requirement using the same course, twice, then they are expected to accept additional responsibility. The additional responsibility is intended to afford the student an education benefit that is at least equivalent to TAing two different courses. Thus, students should expect to supplement their second TA'ship by assuming the teaching apprentice or co-instructor role in the second course installment, as defined below:

- Teaching Assistant (TA) is the norm and generally consists of assisting with grading, holding office hours and tutoring, teaching recitations if these exist, and developing exam questions.
- Teaching Apprentices fulfill all the TA responsibilities, in addition, to some appropriate combination of assisting with lecture design for two or more lectures, managing teaching staff, if there are staff, course module redesign, and homework design.
- Co-instructors are an official designation assigned by the registrar and individuals in this role will share responsibility for the entire course with a second co-instructor, who is usually a faculty member. This may include lead responsibility for one- to two-thirds of the lectures and a commensurate portion of designing and evaluating homework, in-class assignments, and exams.

The table below summarizes the key differences between teaching assistants, teaching apprentices and co-instructors: the columns correspond to roles, checkmarks indicate that a teaching activity is often expected, question marks indicate the activity may arise and dashes indicate the activity is often absent in the role. The roles for teaching apprentice and co-instructor should be individualized to a level of effort and teaching activities that are appropriate for the student and the course. While the responsibilities are monotonically non-decreasing from left to right, the teaching apprenticeship is not a prerequisite to become a co-instructor. Finally, the differences among roles were developed assuming that the course is conducted in a lecture-style, however, the expectation for increasing responsibility for each role can, and should, be adapted to courses taught in any other style.

Teaching Activity	Teaching Assistant	Teaching Apprentice	Co-Instructor

Grading	Typical	Typical	Typical
Lecturing	Maybe	2 or more	1/3-2/3 lectures
Managing staff	No	If there are staff	Typical
Module redesign	Maybe	Typical	Typical
Major course revision	No	Maybe	Maybe
Office hours, tutoring	Typical	Typical	Typical
Recitations	Typical	Typical	Maybe
Design/refine homework	Typical	Typical	Maybe
Design exams	Contribute	Typical	Typical
Assign grades	No	Contribute	Typical

Key: Typical = typical activity in this role, Maybe = activity may arise for this role, No = activity is often absent for this role

SE PhD students who hope to perform any of the above roles should contact the S3D TA coordinator (currently **Michael Hilton**) in the semester before the TA-ship would begin to get approval for TAing. There are typically two cases:

- Case 1: The student is looking for a course to TA. The coordinator will normally have a list of courses that are looking for TAs and the student should discuss possible options with the coordinator.
- Case 2: The student has some idea of the course to TA, perhaps having already talked to the instructor. In this case the student should send an email to the coordinator requesting to be assigned as a TA that course. The request should include: (a) the course number and title, and whether it is primarily an undergrad, master's, or PhD course, (b) whether TAing has been discussed with the instructor, and (c) what role the student would have as a TA in the course (e.g., as part of a team, as the sole TA, etc.).

After serving as a teaching assistant, to receive credit for the teaching requirement, the student must obtain a filled-out teaching assistant evaluation form from the course instructor and provide the SE Ph.D. Program Administrator with a copy of the evaluation.

Students are encouraged to teach more than twice. At the semiannual student review meeting the faculty give special recognition to those who do an outstanding job as a TA and to those who teach beyond the required load. The School of Computer Science and the CMU Eberly Center offer teaching workshops which we encourage students to take advantage of. S3D also regularly offers a CS Pedagogy course (15-890).

Advisors/Advising

Except during their first month in the program, each student has a faculty advisor charged with guiding the education and monitoring the progress of the student through the program. This personal student-advisor relationship ensures that every student receives the necessary faculty mentoring. Throughout the program, the advisor is responsible for guiding the student's research and education. Early in the program, the advisor guides the student along some research initiatives and helps with strategic planning for courses and other educational activities. Later, the advisor helps to focus the student's research interests towards a thesis topic. Toward the end of the program, the advisor chairs the student's thesis committee, and helps to select the other members of the committee. The advisor also provides the student with career advice.

How are advisors initially chosen? When students first arrive at CMU, we provide an orientation known as the Immigration Course, in which students learn about the environment at CMU and meet the faculty. Each faculty member provides an introduction to his or her research. Students are expected to identify faculty with related research interests and set up meetings with those faculty in order to discuss a potential advising relationship. After about a month at CMU, students are matched with faculty advisors through what we call the "handshake" process. Students list faculty preferences and faculty list student preferences; the SE Ph.D. Program Director then matches each student with a faculty member, taking into consideration each of their preferences and other factors.

There is flexibility in the kind of relationship a student has with his or her advisor. While the advisor is a student's primary source of guidance, many students interact closely with faculty other than their formal advisor, for example as part of a research collaboration. A few students have two co-advisors.

Occasionally evolving research interests and other factors motivate changes in advising relationships. It is OK for students to request a change in advisors. Such changes are approved by the SE Ph.D. Program Director with agreement from the new advisor and a consensus about how to gracefully tie up any loose ends in the previous research project.

Any non-courtesy Tenure Track or Research Track faculty member in SCS may serve as a sole advisor or co-advisor. In addition, faculty in other tracks, or in other schools, can serve as advisors with permission of the SE Ph.D. Program Director.

Research Requirements/Directed Research

The Software Engineering Ph.D. is first and foremost a research degree, and carrying out directed research is the most important activity for students in the program. We expect students to spend at least half their time on research throughout the program. Accordingly, active students (i.e., those who are not on LOA or ABS status, are not Dual Degree Portugal students while in Portugal, or are not taking a summer vacation semester) must enroll in approximately 36-48 units of Graduate Reading and Research each semester.

At each semiannual graduate student review meeting, the faculty assess the student's previous semester's research progress and the student's next semester's research plans to ensure that the student is making satisfactory progress. The evaluation of a student's progress in directed research often depends on the student having produced some tangible result; examples include the implementation of pieces of a software system, a written report on research explorations, an annotated bibliography in a major area, or, as part of the preparation for doing research, a passing grade in a graduate course (beyond the 84 required units).

Advisors are responsible for supervising this portion of the Ph.D. program, with regular input from other faculty provided at the semiannual student review as well as in more informal settings.

Students will receive a Pass/Fail grade in Reading and Research 17-997.

Resources and Regulations Governing Research at Carnegie Mellon:
- Office of Sponsored Programs
  https://www.cmu.edu/osp/
- Office of Research Integrity & Compliance
  https://www.cmu.edu/research-compliance/index.html
- Intellectual Property Policy
  https://www.cmu.edu/policies/administrative-and-governance/intellectual-property.html
- Policy on Restricted Research
  https://www.cmu.edu/policies/research/restricted-research.html
- Human Subjects in Research Policy
  https://www.cmu.edu/policies/research/human-subjects-in-research.html

Research funding options
GuSH Research Funding is a source of small research grant funds provided by the Graduate Student Assembly (GSA) and the Provost's Office and managed by the Office of Graduate and Postdoctoral Affairs. Students can find more information about the application process and deadlines at:
https://www.cmu.edu/graduate/professional-development/research-funding/index.html

Resources and Regulations Governing Research at Carnegie Mellon

Use this subsubsection to discuss research resources, as applicable:

Office of Sponsored Programs
https://www.cmu.edu/osp/

Office of Research Integrity & Compliance
https://www.cmu.edu/research-compliance/index.html

Intellectual Property Policy
https://www.cmu.edu/policies/administrative-and-governance/intellectual-property.html

Policy on Restricted Research:
https://www.cmu.edu/policies/research/restricted-research.html

Human Subjects in Research Policy
 https://www.cmu.edu/policies/research/human-subjects-in-research.html

Summer Internship Opportunities

Practice-oriented summer internships are particularly important for students who have had little or no prior full-time experience in the software industry. Faculty can provide help in finding suitable summer in employment.

Different advisors may have different default assumptions about internships and summer support. Students should talk to their advisors about usual expectations and specific summer plans well in advance.

Students who participate in relevant software engineering internships may remain an active student by taking the 17-998 Section I, Practicum Internship course.

International Students/Summer Internship

Ph.D. students are eligible for CPT based internship course if the following conditions are met:

1. You have completed two consecutive semesters in the U.S. maintaining F-1 Status
2. You will enroll in 17-998 - SE Internship Course (Section I). This will count towards your research units that will fulfill your degree requirements
3. You have not yet completed your coursework requirements (there are different eligibility criteria if you have competed your coursework requirements)
4. You have not yet reached the maximum number of off campus employment semester experiences (max of four). Please note an extension into the next semester with the same company will not count as an extra semester in your total of 4 allowable internships during your Ph.D. in Software Engineering.

Ph.D. students are eligible for CPT if they have completed their coursework requirements and:

1. The internship is essential for your dissertation research/data collection
2. The research needed is proprietary and only accessible if you are an employee of a specific employer.
3. The employer provides an email or letter explaining they are aware your employment is for your dissertation, and your employment is necessary to access the research/data needed. They also must provide a brief summary of how your employment is integral for your dissertation
4. Your academic advisor affirms on the OIE CPT advisor form that this internship is needed for research/data collection for our dissertation.
5. You have not yet reached the maximum number of off campus employment semester experiences allowed of 4.

PhD Criteria for Advancement to Candidacy

After the acceptance of a student's thesis proposal by the thesis committee, and after the student has satisfied all other requirements except for the dissertation and its oral defense, the student is regarded as having "all but dissertation" (ABD) status.

An ABD candidate may choose to continue as a regular student In Residence, or, if the residency requirement above is fulfilled; they may choose to be In Absentia (ABS).

ABS - Off Campus: Students who leave CMU but plan to continue working on the thesis will be classified as ABS. These students should not require substantial use of university resources, but are permitted use of the libraries and consultation with faculty or students as necessary. While a candidate is ABS, they are required to pay the university technology fee each semester. No formal enrollment or payment of tuition is required, with the exception of the academic semester in which the degree requirements are completed. A candidate who is ABS is required to enroll for a minimum of five units during the academic semester in which the degree requirements are completed. For students defending remotely without returning to campus a *Dissertation Completion Fee is charged*. Charges for these units are the responsibility of the candidate. (2)

Since an ABS candidate will not be certified by the University as a "student" for immigration purposes, students who are in the United States on a student visa and who become ABD should not choose to become ABS.

ABD - On Campus: Students who are self-supporting and are in ABD status may remain on campus to complete the thesis. They must register and pay for a minimum of five units each semester. However, students who receive a stipend based on their status as a graduate student and
paid by or administered by the university will be required to register for a minimum of 36 research units. Nearly every ABD student in S3D falls into this latter category.

The ABD Status Agreement Form can be found at:
https://www.cmu.edu/hub/docs/abd-status-agree.pdf

Students are advised to read CMU's Doctoral Student Status Policy (https://www.cmu.edu/policies/student-and-student-life/doctoral-student-status.html) and talk to the program administrator to fully understand the financial implications of deciding to switch to In Absentia status, before making any decisions.

PhD Dissertation

The thesis must describe a significant piece of original research work and must describe it well. It is on this basis that the Software and Societal Systems department certifies the qualifications of the new Ph.D.

Furthermore, it is the most important basis on which scientific community judges the initial achievement and potential of that individual.

Thesis Committee

The student's advisor chairs the thesis committee. All other committee members, including the external member, should be agreed upon before the thesis proposal presentation. Members of the student's committee must accept the responsibility of meeting with the student regularly to ensure that the research is progressing in the right direction.

The Thesis Committee must consist of at least one Software and Societal Systems department faculty member, two other members of the SCS faculty and/or other faculty approved by the Institute Head, and an external committee member. All thesis committees are subject to departmental approval.

Thesis Proposal

The student submits a written proposal to the faculty. The student also orally presents the thesis proposal to interested faculty and students in a public colloquium. The Thesis Proposal must describe a significant piece of original research. It is evidence of proficiency, high attainment, and ability to do research in software engineering

Guidelines;
- Explain the basic idea of the thesis topic (e.g., the problem to be solved and the approach to solving it)
- Argue why that topic is interesting (e.g., what contributions to the field would be made in carrying out the proposed work)

- State what kind of results are expected
- Argue that these results are obtainable within a reasonable amount of time
- Demonstrate that the student is qualified to perform the proposed work, including an understanding of the area and its literature

The main purpose of the thesis proposal is to convince the faculty that the chosen thesis topic is significant, and that the student's approach has a reasonable chance of success. A thesis proposal gives the faculty the opportunity to pass such judgment at the start of the work and not at the end. We want to minimize the chance that a thesis will be turned down when almost completed. We expect students to present their thesis proposals as early as possible, not halfway through writing the thesis. A thesis proposal should be short, about 15–20 pages, and the oral presentation should take about 40 minutes, not including questions.

A thesis proposal should **not** be:
- A dry run for the thesis
- A summary or abstract of the thesis
- The first chapter or part of the thesis
- A technical report
- A survey of the field
- An annotated bibliography

Any included list of references or bibliography should serve the purpose of supporting the assessment of the state of the art and the student's personal qualifications.

To provide ample notice to the public, at least one week in advance of the oral presentation, students should provide the SE Ph.D. Program Administrator with an electronic copy or link to the thesis proposal, an electronic copy of the proposal's abstract, and a list of the thesis committee members, including the external member. The committee should also be consulted about the readiness of the proposal before announcing the oral presentation. The SE Ph.D. Program Administrator posts the public announcement of the thesis proposal presentation.

At least **three** thesis committee members (including the Chair) must be physically present for the thesis proposal, and the thesis proposal must be held at Carnegie Mellon. The only exception is for students in Ph.D. programs offered jointly with other universities, in which case the thesis proposal may be held remotely, with one Carnegie Mellon member physically present, and the proposal session broadcast to a Carnegie Mellon room open to the public.

After the presentation and approval of the proposal, the Committee Chair will send the Program Administrator a "Pass form".

When the student has completed all of the program requirements and passes their Proposal, they will complete the Doctoral Candidate Contractual Agreement form provided by the graduate programs administrator.

Thesis Proposal Directions

All Thesis Proposals must be given during the Academic Calander year.

Thesis Proposals should be scheduled only during academic periods – not during holidays, weekends, etc. and should be scheduled in normal business hours. The department head must approve exceptions. Please schedule for 2 hours.

Student should coordinate a date with their committee members and finalize the date as early as possible to allow time for travel arrangements, final review, and comments by committee prior to proposal date.

Student needs to coordinate with their advisor's assistant to secure a room for their proposal. The room scheduled must be available to the public and must accommodate a reasonably large number of people (25-30).

Once you schedule your defense, please each out to out IT team (Tom Pope, or Cole Jester to let them know the date and if you will need any help in setting up for zoom, etc. Please note they will not automatically be there to set up unless you request help.

If Proposal has a remote component such as (Zoom), student is responsible for setting up the zoom link, and completing the "Consent to Publicly Livestream a Presentation".

Thesis Proposal will be announced to the public
Please send the following information to Alisha Roudebush aroudebu@andrew.cmu.edu **ten business** days prior to your proposal date:

1. Your name as it should appear on your diploma
2. Thesis Title
3. Date/Time/Location of proposal presentation
4. Thesis Committee Members, names, titles, affiliations, and email addresses
5. Thesis Abstract – Less than 350 words describing the thesis
6. Pointer to Thesis for any outside faculty who wish to review (Website address, etc.)
7. Print and post 10 Posters to the SCS Community (TCS/Wean/ Gates)
8. Send Connie a PDF of Poster
9. Zoom link, if applicable

Thesis Defense

The student's thesis committee decides whether to accept the thesis based on its content and the outcome of the thesis defense, which is a public presentation describing the contributions of the thesis.

At least **two** weeks in advance of the oral presentation, students must provide the SE Ph.D. Program Administrator with an electronic copy of the abstract and a list of all thesis committee members. The SE Ph.D. Program Administrator posts the public announcement of the thesis defense.

Before the thesis defense, the entire thesis committee is expected to have read the entire thesis, to have given comments to the candidate, and to have given approval for scheduling the public defense. This means that a copy of the complete thesis document should be provided to the whole thesis committee a minimum six weeks in advance of any proposed date for the defense.

Significant deviations from this rule must be approved by the SE Ph.D. Program Director. Committee members should meet briefly before the thesis presentation to discuss any issues.

The presentation by the candidate is normally about 45 minutes, followed by a question-and-answer period which may be as long as needed. Plan to schedule your defense for 3 hours.

As with the thesis proposal, at least three thesis committee members (including the Chair) must be physically present for the thesis defense, with the exceptions described above for Ph.D. programs joint with another university.

The thesis committee chair (advisor) determines who may ask questions and in what order and brings the discussion to a close at the appropriate time. The question-and-answer period is followed by a closed-door session attended by only the members of the thesis committee and any interested faculty members. The options of the committee are:

- To approve without corrections
- To approve subject to minor changes, to be approved later by the thesis chair only
- To require a resubmission after major changes and reapproval of the entire committee
- Not to approve the thesis

All members of the committee are required to sign a Final Oral Examination card, indicating that the student has passed the thesis oral examination. In addition, the thesis committee chair, the Department Head, and the Dean sign a final certification sheet when the student submits the final version of the thesis.

The SE Ph.D. Program Administrator maintains a checklist of procedures for scheduling the thesis oral presentation and completing the other requirements for graduation. The SE Ph.D. Program Administrator certifies fulfillment of requirements for graduation only when the final version of the thesis has been approved by the thesis committee, the Institute Head, and the Dean. Students are not allowed to participate in commencement exercises unless final certification has been made, so the Ph.D. defense should be scheduled a few weeks in advance of graduation to allow time for possible revisions and certification.

If the final copy of the thesis is not submitted within one year of the thesis defense, the faculty may require a second defense before making a final certification.

Your degree title will appear on your diploma as: **Ph.D. in Software Engineering.**

Thesis Defense Scheduling

Thesis Defense should be scheduled only during academic periods – not during holidays, weekends, etc. and should be scheduled in normal business hours. The department head must approve exceptions. Please schedule for 3 hours.

Once you schedule your defense, please each out to out IT team (Tom Pope or Cole Jester) to let them know the date and if you will need any help in setting up for zoom, etc. Please note they will not automatically be there to set up unless you request help.

Student should coordinate a date with their committee members and finalize the date as early as possible to allow time for travel arrangements, final review, and comments by committee prior to defense date.

Student needs to coordinate with their advisor's assistant to secure a room for their defense if on campus. The room scheduled must be available to the public and must accommodate a reasonably large number of people (25-30).

If you are a full-time student currently registered for 48 units, there are no other financial responsibilities for you.

If you are not a full time on campus student, the following will apply:

If your Defense is remote only (via Zoom), student is responsible for setting up the zoom link, and completing the "Consent to Publicly Livestream a Presentation".

While an All But Dissertation student is In Absentia, no tuition will be assessed. The student will, however, be responsible for all applicable fees.

If your dissertation is on campus, you must register and pay for 5 units of tuition. Please talk with your advisor to see if they will cover either the remote cost or the on-campus cost. You can find the Tuition and Fee Effects under the "In Absentia Student Status Including the Final Semester Fees" at the link below:

Https://www.cmu.edu/policies/student-and-student-life/doctoral-student-status.html

Preparing your Thesis Document:
Please contact Catherine Copetas (copetas@cs.cmu.edu) for the following information:
1. Latex Template (See below for example of title page)

2. Request a TR number (Department is S3D)
3. Check for proper title page format (verify with Catherine prior to final submission)- See example at the end of the directions.

Thesis Defense will be announced to the public by the Program Administrator.
Please send the following information to Alisha Roudebush no less than **10 business days** prior to your defense date:
1. Your name as it should appear on your diploma
2. Thesis Title
3. Date/Time/Location of defense presentation
4. Thesis Committee Members, names, titles, affiliations, and email addresses
5. Thesis Abstract – Less than 350 words describing the thesis
6. Pointer to Thesis for any outside faculty who wish to review (Website address, etc.)
7. Print and post 10 Posters to the SCS Community (TCS/Gates)
8. Send Connie a PDF of Poster

Process for Completing a Master's Degree enroute to a Ph.D.

Ph.D. students may wish to have their progress in the program recognized by receiving a Master of Science in Software Engineering degree upon completion of an appropriate number of Ph.D. program requirements. These requirements serve to characterize the student's preparedness to develop a doctoral thesis proposal in the program.

Upon completing the Master of Science in Software Engineering degree, students should be able to:

- Demonstrate breadth of knowledge across three foundational areas in software engineering.
- Demonstrate the ability to identify, read, and understand relevant research literature, and to design a research study using an established research method.

The above learning objectives can be realized by the following course plan:
- Complete the Software Engineering Research Course
- Participate in the Software Engineering Research Seminar (SSSG) each semester, unless excused by the Program Director due to a course conflict.
- Complete four additional courses, covering at least three of the four-star areas
- Complete 96 units of supervised research
- Either complete an additional 24 units of research or coursework, or else serve as a teaching assistant for one semester
- Fulfill the writing requirement

The learning objectives and sample course plan are equivalent to a two-year master's program with no thesis option. All courses used to qualify for the master's degree must be taken at CMU, and no master's degree will be granted to a student who has previously received a master's

degree from the CMU School of Computer Science. The degree is granted upon written request by the student to the SE Ph.D. Program Administrator once they have completed sufficient requirements to demonstrate the learning objectives.

Students may request this during the Doctoral Student Review Process that is held every Fall and Spring, by requesting it on their Student Statement.

Leave of Absence

Students who wish to leave the program temporarily may request a leave of absence by submitting a request to the SE Ph.D. Program Director, with a cc to the Program Administrator. Leaves are initially granted for a period of no more than one year, but an extension of up to one additional year may be granted under exceptional circumstances. When an extension is granted, the conditions for return must be negotiated with the advisor and the SE Ph.D. Program Director prior to returning to the program. Students must be in good standing to be granted a leave of absence.

Students on a leave of absence should contact the SE Ph.D. Program Administrator two months prior to the end of the leave to indicate their plans. While a leave can in principle start at any time, university regulations allow students to return only at the beginning of a semester (usually late August or January).
Reference University process for leave of absence:
https://www.cmu.edu/hub/registrar/leaves-and-withdrawals/

Summary of Graduate Student Appeal and Grievance Procedures

Graduate students will find the Summary of Graduate Student Appeal and Grievance Procedures on the Graduate Education Resource webpage. This document summarizes processes available to graduate students who seek review of academic and non-academic issues.

Generally, graduate students are expected to seek informal resolution of all concerns within the applicable department, unit, or program before invoking formal processes. When an informal resolution cannot be reached, however, a graduate student who seeks further review of the matter is to follow the formal procedures outlined here.

These appeal and grievance procedures shall apply to students in all graduate programs of the University. Students should refer to the department specific information in this handbook for department and college information about the administration and academic policies of the program.

https://www.cmu.edu/graduate/policies/appeal-grievance-procedures.html

Grading and Evaluation

Dept./College Grading Scale/System

A student's progress in the Ph.D. program is measured along multiple dimensions. One of these dimensions is a student s performance in courses, and our expectation is that Ph.D. students earn a B- or better. Grades of C+ or below do not count towards program requirements.

Grades are just one dimension of student performance, and in fact are largely irrelevant for students who complete the program. To encourage students to place their primary focus on research over coursework, our general program policy is to record grades as pass/fail in the student's official transcript. Note, however, that although C and D grades will be converted to a pass on the transcript per university registrar policy, the above policy that the student earn the equivalent of a B- or better internal grade in order to fulfill a program requirement still applies.

SE Ph.D. students may register for graduate or undergraduate courses in other departments. However, where possible, they should register for these courses with pass/fail grading.

A form to request pass/fail grading is available on the university HUB website. While we encourage all instructors to follow our general policy for SE Ph.D. students in their courses, instructors have the discretion to make their courses letter graded only, which overrides the general policy above for those specific courses.

The program administrator will reach out to all instructors to verify the student received a B- or better in all courses that are Pass/Fail.

Once the required coursework is completed, students register only for a blanket course (e.g., "Reading and Research") covering all their program activities for that semester, for which they receive a Pass/No Pass grade.

Department policy on pass/fail, satisfactory/unsatisfactory

If a student requests a Pass/Fail as a grade, they must receive a B- or better in order to receive credit for the course. An email will be sent to the teaching faculty member at the end of the semester to verify the grade was equivalent to a B- or better.

University Policy on Grades

University policy on grades:
https://www.cmu.edu/policies/student-and-student-life/grading.html

Process for Appealing Final Grades

https://www.cmu.edu/student-affairs/theword/academic/appeal-of-grades-and-academic-actions.html

Final grades will be changed only in exceptional circumstances and only with the approval of the instructor and the department, unit or program. Grading is a matter of sound discretion of the instructor and final grades are rarely changed without the consent of the instructor who assigned the grade. The following circumstances are the unusual exceptions that may warrant a grade appeal: (a) the final grade assigned for a course is based on manifest error (e.g. a clear error such as arithmetic error in computing a grade or failure to grade one of the answers on an exam), or (b) the faculty or staff member who assigned the grade did so in violation of a University policy.

Policy on Grades for Transfer Courses

https://www.cmu.edu/policies/student-and-student-life/transfer-credit-evaluation-and-assignment.html

Carnegie Mellon University offers students the opportunity to take courses for credit through a cross-registration program (see Pittsburgh Council on Higher Education (PCHE) and Cross-registration below) and through the receipt of transfer credit from other accredited institutions. The Carnegie Mellon University transcript will include information on such courses as follows: Carnegie Mellon courses and courses taken through the university's cross-registration program will have grades recorded on the transcript and be factored into the QPA. All other courses will be recorded on this transcript indicating where the course was taken, but without grade. Such courses will not be taken into account for academic actions, honors or QPA calculations.

Doctoral Student Review (DSR)

Evaluation and feedback on a student's progress are important both to the student and to the faculty. Students need information on their overall progress to make long-range plans. The faculty need to make evaluations to advise students, to make support decisions, and to write recommendations to potential employers.

The faculty meet at the end of each semester to make a formal evaluation of each student in the Ph.D. program. This meeting is called the "Doctoral Student Review" meeting. The purpose of having all the faculty meet together to discuss all the students is to ensure uniformity and consistency in evaluation across all the different areas, by all the different advisors, throughout the years of the SE Ph.D. program as it inevitably changes.

The faculty measure each student's progress against the goal of completing the Ph.D. program in a reasonable period of time. The evaluation considers all components of the program using indicators and information sources described below. Requirements need not be fulfilled in any particular order, but each student must show reasonable progress each semester toward satisfying the full set of requirements. Because the critical path to completing the Ph.D. is research, making early and regular research progress is the most important consideration. Through a Doctoral Student Review letter, the faculty inform students of the results of this evaluation, which may include specific recommendations for future work or requirements that

must be met for continued participation in the program.

Components and Indicators

In their evaluation, the faculty consider the following components, though naturally only some of these components will be applicable in any given semester; they are not equally important at every stage of a student's career, and each student will progress through the requirements as suits his or her individual needs:

- *Directed research*: Evaluated by research supervisor and other collaborating faculty.
- *Courses taken*: Evaluated by the course instructor—brief prose evaluation/summary grade.
- *Teaching:* Evaluated by the course instructor and two different teaching evaluation forms (One filled out by the course instructor and the other filled out by students, where appropriate).
- *Skills:* Writing and speaking, by the relevant faculty and forms.
- *Thesis:* Status summarized by the thesis advisor and comment by members of the thesis committee.
- *Other:* Lectures given, papers written, etc. Evaluated by cognizant faculty.

The faculty's primary sources of information about the student are the student's advisor and the student's statement. The advisor is responsible for assembling the above information and presenting it at the faculty meeting. The student should make sure the advisor is informed about participation in activities and research progress made during the semester. Each student is asked to submit a summary of this information to the advisor at the end of each semester—the Student Statement for Doctoral Review at https://gsaudit.cs.cmu.edu. This statement is used as student input to the evaluation process and as factual information on activities and becomes part of the internal student record. It is strongly recommended that the student and advisor meet prior to the faculty meeting to review the information provided in this statement.

Outcomes and Recommendations

Based on the above information, the faculty decide whether a student is making satisfactory progress in the Ph.D. program. If so, the faculty usually suggest goals for the student to achieve over the next semester. If not, the faculty make more rigid demands of the student; these may be long-term (e.g., finish your thesis within 1-1/2 years) or short-term (e.g., select and complete one or more specific courses next semester; prepare a thesis proposal by next Doctoral Review meeting).

Ultimately, permission to continue in the Ph.D. program is contingent on whether or not the student continues to make satisfactory progress toward the degree. If a student is not making satisfactory progress, the faculty may choose to drop the student from the program.

The faculty also decide whether financial support (including tuition and stipend) should be continued for each student. Termination of support does not always mean termination from the

program

Academic Integrity

https://www.cmu.edu/policies/student-and-student-life/academic-integrity.html
The policy includes the University expectations around academic integrity and provides definitions of cheating, plagiarism, and unauthorized assistance.

A review of the University's Academic Disciplinary Actions procedures is also recommended. These procedures outline the process for investigating, reporting, and adjudicating violations of the University Policy on Academic Integrity. The procedures also outline the appeal process.

Safeguarding Educational Equity

Assistance for Individuals with Disabilities

http://www.cmu.edu/education-office/disability-resources/

The Office of Disability Resources at Carnegie Mellon University has a continued mission to provide physical, digital, and programmatic access to ensure that students with disabilities have equal access to their educational experience. We work to ensure that qualified individuals receive reasonable accommodations as guaranteed by the Americans with Disabilities Act (ADA) and Section 504 of the Rehabilitation Act of 1973. Students who would like to receive accommodations can begin the process through Disability Resources' secure online portal:

https://rainier.accessiblelearning.com/cmu/

or email access@andrew.cmu.edu to begin the interactive accommodation process. Students with physical, sensory, cognitive, or emotional disabilities are encouraged to self-identify with the Office of Disability Resources and request needed accommodations. Any questions about the process can be directed to access@andrew.cmu.edu, or call (412) 268-6121.

Sexual Misconduct Policy

The University prohibits sex-based discrimination, sexual harassment, sexual assault, dating/domestic violence, sexual exploitation, stalking, and violation of protective measures. The University also prohibits retaliation against individuals who bring forward such concerns or allegations in good faith.

The University's Sexual Misconduct Policy is available at:
https://www.cmu.edu/policies/administrative-and-governance/sexual-misconduct/index.html

The University's Policy Against Retaliation is available at:

https://www.cmu.edu/policies/administrative-and-governance/whistleblower.html

If you have been impacted by any of these issues, you are encouraged to make contact with any of the following resources:

Office for Institutional Equity and Title IX
http://www.cmu.edu/title-ix/

412-268-7125
institutionalequity@cmu.edu

University Police
https://www.cmu.edu/police/
412-268-2323

Additional resources and information can be found at:
https://www.cmu.edu/title-ix/resources-and-information/index.html

Gestational and Parental Accommodations

https://www.cmu.edu/graduate/programs-services/maternity-accommodation-protocol.html

Providing holistic student support is a top priority at Carnegie Mellon. The protocols on this page are designed to support the parental needs of students and their families.

Students seeking any of the Parental Accommodations described below must register with the Office of the Dean of Students by contacting the office for an appointment by calling 412-268-2075.

Students are encouraged to register with the Office of the Dean of Students ninety (90) days in advance of the anticipated arrival of the child as applicable in the individual circumstance. At the time of registering, students will have the opportunity to consult about resources, procedures, funding options and preparation for discussing academic accommodations with the student's academic department. Students should also consult with their academic advisors either before or in conjunction with registering with the Office of the Dean of Students.

Accommodations for Gestational Parents
The birth of a child is a significant life event that may require time away from academic pursuits for delivery and recovery from delivery of a newly born child. Students whose anticipated delivery date is during the course of a semester may need to take time away from their academic responsibilities. Carnegie Mellon students seeking time away are afforded two options as possible accommodation:

Short-Term Accommodation for Gestational Parents – A short term absence from academic responsibilities up to a maximum of six (6) weeks. Short-Term Accommodation may be extended by two (2) weeks, for a total of eight (8) weeks, where a longer absence is medically necessary. Prior to the absence students must work with relevant university faculty and staff to adjust their course work, research, teaching and other academic responsibilities during the period of absence. This may include extensions of time to complete assignments, incomplete grades, and/or dropping courses, shifting research responsibilities and adjusting TA assignments. Students who take a Short-Term Accommodation will remain enrolled.

Formal Leave of Absence– A formal leave of absence under the Student Leave Policy. Generally, the Student Leave Policy permits students to take a leave of absence for a full-semester, mini-semester, or for the time remaining in the semester during which the leave is taken. Students who take a Formal Leave of Absence (https://www.cmu.edu/policies/student-and-student-life/student-leave.html) drop all remaining courses for the semester and are unenrolled for the semester. International students must consult with the Office of International Education (https://www.cmu.edu/oie/) before considering this option due to visa implications.

Parental Accommodation for Doctoral Students
The university offers a Parental Accommodation for qualifying doctoral student parents to include up to four (4) weeks of time away from academic responsibilities with continued stipend support. This accommodation can be utilized within six months of the birth or placement of a child through adoption, foster care or legal guardianship. Gestational parents may utilize both the Short-Term Accommodation for Gestational Parents and the parental accommodation.

Careful planning and consultation is necessary given the unique contexts and requirements of each student's situation. Students will remain fully enrolled and will receive assistance in navigating the necessary planning and consultation processes.

Financial Assistance for Student Parents
Carnegie Mellon also offers the following options for financial assistance to students who become parents while enrolled:

Interest Free Loan – Any student who becomes a parent is eligible to apply for an interest-free parental loan (https://www.cmu.edu/student-affairs/dean/loans/) from the Office of the Dean of Students.

Doctoral Stipend Continuation (Gestational Parents) – Doctoral students who are the gestational parent and who receive an academic stipend funded by Carnegie Mellon are eligible to continue to receive stipend funding for up to six (6) weeks during a Short-Term Accommodation for Gestational Parents or during a Formal Leave of Absence. Continued academic stipend funding may be extended by two (2) weeks, for a total of eight (8) weeks, if an absence longer than six weeks is medically necessary.

Doctoral Stipend Continuation (Non-gestational Parents) – Doctoral students who receive an academic stipend funded by Carnegie Mellon and are becoming a parent by adoption, birth, or through guardianship are eligible to continue to receive stipend funding for up to four (4) weeks during a Short-Term Parental Accommodation.

Consensual Intimate Relationship Policy Regarding Undergraduate students

https://www.cmu.edu/policies/student-and-student-life/consensual-relationships.html

This policy addresses the circumstances in which romantic, sexual or amorous relationships/interactions with undergraduate students, even if consensual, are inappropriate and prohibited. The purpose of this policy is to assure healthy professional relationships. This policy is not intended to discourage consensual intimate relationships unless there is a conflicting professional relationship in which one party has authority over the other as in the policy.

Additional department and university policies/protocols

Verification of Enrollment

Enrollment Services is the only University office that can provide an official letter of enrollment, official transcript and enrollment verification.

Enrollment verification can be requested online through The HUB at:
https://www.cmu.edu/hub/registrar/student-records/verifications/enrollment.html

Change of Address

Students are to login to SIO to keep your current local address up to date. This supports a university initiative to have accurate living information for students for official program/department/college/university notices, the ability to facilitate wellness checks, ensure international students are in compliance with visa requirements, etc.

Time Away from Academic Responsibilities

Students with graduate assistantships are expected to continue with their research during academic breaks (including summer months) with the exception of official University holidays*.

Paid time off for personal business or vacations generally is not included as part of a graduate's financial support. A supported graduate student who wants to take a short break (up to ten days) must get approval for that break from his/her advisor and, if required by the terms of the student's support package, must make up the work. Supported graduate students wishing to take longer periods of personal time off must do so without financial support and must receive

approval from their advisor at least five weeks prior to the requested time off. The advisor will notify the Department's Business Office of any such arrangements so that an appropriate adjustment in the student's support package can be processed.

Please note University Holidays are student holidays as well and students need to consult with their advisor about coverage during University Holidays if they have challenges with taking time off during that time, i.e., if experiments are running that need to be monitored continuously. Arrangements can be made for students to take an equal number of days off at another time.

University Holidays:
- New Year's Day
- Martin Luther King Jr. Day
- Memorial Day
- Juneteenth
- Independence Day
- Labor Day
- Thanksgiving Day
- Day After Thanksgiving
- Day Before Christmas
- Christmas Day
- Day Before New Year's Day

Employment Eligibility Verification

If you are receiving a stipend, are a TA, or are planning to have a position with CMU then Employment Eligibility Verification is required. Form I-9 must be completed within 3 business days of beginning work for any type of compensation (stipend or employment). Additional details are highlighted below.

To ensure compliance with federal law, Carnegie Mellon University maintains the Employment Eligibility Verification (I-9) Policy [pdf] covering the university's I-9 and E-Verify requirements:

Every individual receiving a stipend from CMU or employed by CMU must comply with the I-9 Policy by completing the Form I-9 within three business days following the first day of stipend start date/employment.

Individuals who expect to work on a federally funded project are further responsible for submitting an E-Verify Processing Request Form to the Office of Human Resources if required.

For more information, please see CMU's Guidance for Completing the Form I-9 and E-Verify Requirements at CMU [pdf], or visit the Human Resources Service website to learn more about Form I-9 and E-Verify and to schedule an appointment to complete the Form I-9.

Students who fail to complete the Form I-9 in a timely manner may have stipend payments

suspended. If employed by the university, an individual who fails to timely complete the Form I-9 may be subject to disciplinary action up to and including termination of employment.

Financial Support

Financial support and permission to continue in the Ph.D. program depend on making satisfactory progress each semester. Please review **section 28** (DSR Review)

Academic Year Support

The Department aims to allow students as much freedom as is possible in choosing research directions, subject to the interests and expertise of the faculty who are available to oversee the work. The Ph.D. program thus places the responsibility on the advisor to secure funding to support their students. The Department commits to providing full financial support (covering tuition, fees, and a stipend) **as long as a student remains in good academic** standing and continues
to make suitable progress toward their degree, at an acceptable pace, as determined by the program's faculty (see Section 31). This commitment means that if, for example, an advisor temporarily fails to secure sufficient funding to support a student's work, the department will ensure that student continues to be paid. However, we note the responsibility of students to work closely with their advisors to ensure a good ongoing match between student interest and advisor expertise, resources, and sponsor interest.

Student (SHIP) Health Insurance Coverage

If you elect to enroll in Carnegie Mellon University's Student Health Insurance Plan (SHIP), the University will cover 100% percent of the premium cost for your individual coverage under SHIP. While you will have the opportunity to purchase partner, spouse or dependent coverage under the SHIP plan, the University's support will be 100% percent of the individual coverage amount. Please note that if you wish to elect the required health insurance coverage under an alternate plan, you will not be eligible for the University support referenced here.

https://www.cmu.edu/health-services/student-insurance/plans.html

https://www.cmu.edu/sfs/billing/payments/monthly-plan/index.html

The HUB's website (https://www.cmu.edu/hub/new-grad/enrollment-finances.html) also has information specific to health insurance coverage and waivers for doctoral students.

Conference Funding

Conference Funding is a funding application process provided by GSA and the Provost's Office for students, student work groups or groups to attend a conference, whether as a participant or as a

presenter. The process is managed by the Office of Graduate and Postdoctoral Affairs. Students can find more information about the application process and deadlines at:

https://www.cmu.edu/graduate/professional-development/index.html

Research Funding

GuSH Research Funding is a source of small research grant funds provided by GSA and the Provost's Office and managed by the Graduate Education Office. Students can find more information about the application process and deadlines at:

https://www.cmu.edu/graduate/professional-development/research-funding/index.html

Outside Funding, Fellowship and Scholarship Opportunities

We encourage students to seek their own external funding since often the award is prestigious (e.g., NSF or Hertz) or the source provides an opportunity to make professional connections (e.g., an industrial fellowship).

If a student receives an external fellowship/scholarship, they must notify the SE Ph.D. Program Administrator. The Institute supplements the stipends of students with an outside fellowship to meet the stipends of students with internal funding, plus a bonus: in a year when a student brings in a fellowship worth $X, that student gets 1% of X added to their stipend each month, for a total of 12% of X if the student *takes a stipend all 12 months.*

 The department also pays a dependency allowance that is 10% of the S3D monthly base stipend per eligible dependent provided that your spouse or qualifying domestic partner earns less than 15% of the stipend amount.

Department Policy on Outside Employment

International students must contact the Office of International Education regarding their ability to hold employment.

Working (i.e., doing anything for pay) either within or externally to the university, beyond your responsibilities as a teaching assistant or research assistant, is a privilege, not a right. We grant this privilege for one of two reasons:
- The employment is relevant to the student's thesis work or a Carnegie Mellon research project.
- The student has exceptional financial obligations.

Employment is normally limited to a maximum of one day per week (8 hours per week).
A student who wishes to work must obtain prior permission from his or her advisor and the SE Ph.D. Program Director.

We may require that students limit employment to be in compliance with university and government rules, but the more important principle is maintaining adequate focus and creative energy for the research that is at the core of the Ph.D. degree.

Lost Funding

International Students must notify the Office of International Education (OIE) if they lose their funding.
Discuss Department Emergency Student Loan made available through the department (if applicable).
Reference the Office of the Dean of Students Emergency Student Loan Program:

Graduate students who find themselves in need of immediate funds for emergency situations should contact the Office of the Dean of Students:

https://www.cmu.edu/student-affairs/index.html
…to inquire about an Emergency Student Loan

Office of the Dean of Students Emergency Support Funding

Graduate students who find themselves in need of immediate funds for emergency situations should contact the Office of the Dean of Students:

https://www.cmu.edu/student-affairs/index.html
to inquire about the types of emergency funding available to enrolled students.

Appendix A: Time Estimates

The following table indicates estimates for approximately when students should have finished each requirement. Overall, we expect students to complete the program within 5-6 years, depending on background and dissertation research.

These figures are meant to be suggestive, not prescriptive, and can be modified for any student by agreement with the student's advisor. We present them so all faculty and students can develop a shared image of a typical path through the program.

Component	Intensity	Completion time
Practicum	¼ time	By end of year 2
Writing skills	variable	By end of year 2
Speaking skills	SSSG	By end of year 3
Course requirements	each ¼ time	By end of year 4
Thesis proposal	½ time	By end of year 4
Teaching	½ time	By end of year 5
Thesis	full time	By end of year 5 or 6

Students are expected to be working on research every semester with intensity at least 1/2 time throughout their time at CMU. In addition, it is expected that students volunteer within the department and school throughout their time at CMU.

Appendix B: Outcome to Requirement Mapping

The following table provides a correspondence between the program outcomes and the program requirements. In the table, a filled-in box indicates that the activity on the left is a principal contributor to the outcome above, whereas an outlined box indicates that the activity is an auxiliary contributor to the outcome. Naturally, for individual students, other activities might contribute as well.

Activity (Program Requirement)	Independent Research	Research Methods	Depth in Area	Broad SE Knowledge	Teaching SW	Comm Skills	Practical Development	Mature Perspective
Dir research	■	■	■	□		□	□	□
Thesis	■	■	■			□		
Course: Core				■	■			
Course: SYM		■	□	■	□			
Course: ENG		□	□	■	□		□	
Course: BEH		■	□	■	□			
Course: SOC			□	■				■
Electives			■	■	□			
SSSG		□		■		■		
TAing					■	□		
Comm skill	□				□	■		
Practicum							■	□

Appendix C: University Resources for Graduate Students

Key Resources for Graduate Student Support

Office of Graduate and Postdoctoral Affairs

`https://www.cmu.edu/graduate`

`graded@cmu.edu`

The Office of Graduate and Postdoctoral Affairs provides university-wide support for all graduate students and academic programs, with a focus on supporting graduate student success at Carnegie Mellon. Examples of resources offered through the Office of Graduate and Postdoctoral Affairs include, but are not limited to:

- Website with university resources, contact information for CMU programs and services, possible financial assistance and potential funding opportunities, and various procedural and policy information

- Newsletter to all graduate students with information on activities, resources, and opportunities

- Professional development seminars and workshops, and various programming and events for the graduate student community

The Office of Graduate and Postdoctoral Affairs also works directly with the colleges and departments on issues related to graduate students and serve as a resource for developing policy and procedures. The Office of Graduate and Postdoctoral Affairs partners with many other offices and organizations, such as the Graduate Student Assembly, to support the holistic graduate student educational experience.

Office of the Dean of Students

`https://www.cmu.edu/student-affairs/dean/`

The Office of the Dean of Students provides central leadership of the metacurricular experience at Carnegie Mellon including the coordination of student support. Graduate students will find the enrollment information for Domestic Partner Registration and Parental Accommodations in the Office of the Dean of Students or on their website. This Office also manages the Student Emergency Support Funding process. There are currently three forms of support funding for enrolled students: emergency student loans, student parental loans, and the Tartan Emergency Support Fund. Inquiring students will be provided with additional information about the various types of funding during a

consultation meeting with a member of the Dean of Students team. Tuition costs are not eligible for Student Emergency Support funding.

College Liaisons and the Student Support Resources team serve as additional resources for graduate students. College Liaisons are senior members of the Division of Student Affairs who work with departments and colleges addressing student concerns across a wide range of issues. College Liaisons are identified on the Important Contacts list in Student Information Online (SIO). The Student Support Resources team offers an additional level of support for students who are navigating a wide range of life events. Student Support Resources staff members work in partnership with campus and community resources to provide coordination of care and support appropriate to each student's situation.

The Division of Student Affairs

The Division of Student Affairs includes (not an exhaustive list):

- Athletics, Physical Education and Recreation
- Career and Professional Development Center (CPDC)
- Center for Student Diversity and Inclusion
- Cohon University Center
- Counseling & Psychological Services (CaPS)
- Dining Services
- Office of Community Standards and Integrity (OCSI)
- Office of Student Leadership, Involvement, and Civic Engagement (SLICE)
- University Health Services (UHS)
- Wellness Initiatives

Center for Student Diversity & Inclusion

`https://www.cmu.edu/student-diversity/`

Diversity and inclusion have a singular place among the values of Carnegie Mellon University. The Center for Student Diversity & Inclusion actively cultivates a strong, diverse and inclusive community capable of living out these values and advancing research, creativity, learning and development that changes the world.

The Center offers resources to enhance an inclusive and transformative student experience in dimensions such as access, success, campus climate and

intergroup dialogue. Additionally, the Center supports and connects historically underrepresented students and those who are first in their family to attend college in a setting where students' differences and talents are appreciated and reinforced, both at the graduate and undergraduate level. Initiatives coordinated by the Center include, but are not limited to:

- First generation/first in family to attend college programs

- LGBTQ+ Initiatives

- Race and ethnically focused programs, including Inter-University Graduate Students of Color Series (SOC) and PhD SOC Network

- Women's empowerment programs, including Graduate Women's Gatherings (GWGs)

Assistance for Individuals with Disabilities

https://www.cmu.edu/disability-resources/

The Office of Disability Resources at Carnegie Mellon University has a continued mission to provide physical, digital, and programmatic access to ensure that students with disabilities have equal access to their educational experience. The Office works to ensure that qualified individuals receive reasonable accommodations as guaranteed by the Americans with Disabilities Act (ADA) and Section 504 of the Rehabilitation Act of 1973. Students who would like to receive accommodations can begin the process through Disability Resources' secure online portal or email access@andrew.cmu.edu to begin the interactive accommodation Process.

Students with physical, sensory, cognitive, or emotional disabilities are encouraged to self-identify with the Office of Disability Resources and request needed accommodations. Any questions about the process can be directed to access@andrew.cmu.edu, or call (412) 268- 6121.

Eberly Center for Teaching Excellence & Educational Innovation

https://www.cmu.edu/teaching/

The Eberly Center offers a wide variety of confidential, consultation services and professional development programs to support graduate students as teaching assistants or instructors of record during their time at Carnegie Mellon University and as future faculty members at other institutions. Regardless of one's current or future teaching context and duties, Eberly's goal is to disseminate evidence-based teaching strategies in ways that are accessible and

actionable. Programs and services include campus-wide Graduate Student Instructor Orientation events and our Future Faculty Program, both of which are designed to help participants be effective and efficient in their teaching roles. The Eberly Center also assists departments in creating and conducting customized programs to meet the specific needs of their graduate student instructors. Specific information about Eberly Center support for graduate students is found at:

https://www.cmu.edu/teaching/graduatestudentsupport/

Graduate Student Assembly

https://www.cmu.edu/stugov/gsa/

The Graduate Student Assembly (GSA) is the branch of Carnegie Mellon Student Government that represents and advocates for the diverse interests of all graduate students at CMU. GSA is composed of representatives from the different graduate programs and departments who want to improve the graduate student experience at the different levels of the university. GSA is funded by the Student Activities Fee from all graduate students. GSA passes legislation, allocates student activities funding, advocates for legislative action locally and in Washington D.C. on behalf of graduate student issues and needs, and otherwise acts on behalf of all graduate student interests. GSA's recent accomplishments are a testament to their making a difference, and steps to implementing the vision laid out by the strategic plan.

https://www.cmu.edu/stugov/gsa/about-the-gsa/strategic-plan.html

GSA offers an expanding suite of social programming on and off-campus to bring graduate students from different departments together and build a sense of community. GSA is the host of the Graduate Student Lounge on the 3rd floor of the Cohon University Center. GSA also maintains a website of graduate student resources on and off-campus. GSA continues to rely on student feedback to improve the graduate student experience at CMU. Feel free to contact them at gsa@cmu.edu to get involved, stop by their office in the Cohon University Center Room 304 or become a representative for your department.

Office of International Education (OIE)

https://www.cmu.edu/oie/

Carnegie Mellon hosts international graduate and undergraduate students who come from more than 90 countries. The Office of International Education (OIE) is the liaison to the University for all non-immigrant students and scholars, as

well the repository for study abroad opportunities. OIE provides many services including: advising on personal, immigration, study abroad, academic, and social and acculturation issues; presenting programs of interest such as international career workshops, tax workshops, and cross-cultural and immigration workshops; international education and statistics on international students in the United States; posting pertinent information to students through email and the OIE website and conducting orientation and pre-departure programs.

Veterans and Military Community

> https://www.cmu.edu/veterans/

Military veterans are a vital part of the Carnegie Mellon University community. Graduate students can find information on applying for veteran education benefits, campus services, veteran's groups at CMU, and non-educational resources through the Veterans and Military Community website. There are also links and connections to veteran resource in the Pittsburgh community. The ROTC and Veteran Affairs Coordinator can be reached at urovaedbenefits@andrew.cmu.edu or 412-268-8747.

Carnegie Mellon Ethics Hotline

> https://www.cmu.edu/hr/resources/ethics-hotline.html

The health, safety and well-being of the university community are top priorities at Carnegie Mellon University. CMU provides a hotline that all members of the university community should use to confidentially report suspected unethical activity, violations of university policy, or violations of law. Students, faculty and staff can anonymously file a report by calling 1-844-587-0793 or visiting https://cmu.ethicspoint.com/. All submissions are reported to appropriate university personnel and handled discreetly.

The hotline is NOT an emergency service. For emergencies, call University Police at 412-268-2323.

Policy Against Retaliation

It is the policy of Carnegie Mellon University to protect from retaliation any individual who makes a good faith report of a suspected violation of any applicable law or regulation, university Policy or procedure, any contractual obligation of the university, and any report made pursuant to the Carnegie Mellon University Code of Business Ethics and Conduct.

Additional details regarding the Policy Against Retaliation are available at:

    https://www.cmu.edu/policies/administrative-and-governance/whistleblower.html

Key Offices for Academic & Research Support

Computing and Information Resources

    https://www.cmu.edu/computing/

Computing Services maintains and supports computing resources for the campus community, including the campus wired and wireless networks, printing, computer labs, file storage, email and software catalog. As members of this community, we are all responsible for the security of these shared resources. Be sure to review the Safe Computing (`https://www.cmu.edu/computing/safe/`) section and the University Computing Policy (`https://www.cmu.edu/policies/information-technology/computing.html`)

Visit the Computing Services website (`https://www.cmu.edu/computing/`) to learn more. For assistance the Computing Services Help Center is available at 412-268-4357 (HELP) or `ithelp@cmu.edu`.

Student Academic Success Center

    https://www.cmu.edu/student-success/

The Student Academic Success Center's (SASC) work to support success focuses on creating spaces for students to engage in their coursework and approach to learning through many group and individual program options. SASC supports student success by providing academic coaching, subject-specific tutoring, effective communication strategies, accommodations for students with disabilities, and language support for multilingual learners. SASC engages with faculty and staff to improve the coordination and professional development for academic advisors. Visit the SASC website for more information about services offered in areas such as communication and language support; language and cross-cultural support; and learning support.

University Libraries

    https://www.library.cmu.edu/

The University Libraries offers a wide range of information, resources, and services supporting graduate students in coursework, research, teaching, and publishing. The library licenses and purchases books, journals, media, and other needed materials in various formats. Library liaisons, consultants, and information specialists provide in-depth and professional assistance and advice in all-things information, including:

- Locating and obtaining specific resources

- Providing specialized research support

- Advanced training in the use and management of data

Sign up for workshops and hands-on topic-specific sessions such as data visualization with Tableau, cleaning data with OpenRefine, and getting started with Zotero. Weekly drop-in hours for Digital Humanities and for Research Data Research Management are scheduled during the academic year. Start at the library home page to find the books, journals, and databases you need; to identify and reach out to the library liaison in your field; to sign up for scheduled workshops; and to connect with consultants in scholarly publishing, research data management, and digital humanities.

Research at CMU

https://www.cmu.edu/research/

The primary purpose of research at the university is the advancement of knowledge in all fields in which the university is active. Research is regarded as one of the university's major contributions to society and as an essential element in education, particularly at the graduate level and in faculty development. Research activities are governed by several university policies. Guidance and more general information are found by visiting the Research at Carnegie Mellon website.

Office of Research Integrity & Compliance

https://www.cmu.edu/research-compliance/

The Office of Research Integrity & Compliance (ORIC) is designed to support research at Carnegie Mellon University. The staff work with researchers to ensure research is conducted with integrity and in accordance with federal and Pennsylvania regulation. ORIC assists researchers with human subject research, conflicts of interest, responsible conduct of research, export controls, and institutional animal care & use. ORIC also provides consultation, advice, and review of allegations of research misconduct.

Key Offices for Health, Wellness & Safety

Counseling & Psychological Services

https://www.cmu.edu/counseling/

Counseling & Psychological Services (CaPS) affords the opportunity for students to talk privately about academic and personal concerns in a safe, confidential setting. An initial consultation at CaPS can help clarify the nature of the concern, provide immediate support, and explore further options if needed. These may include a referral for counseling within CaPS, to another resource at Carnegie Mellon, or to another resource within the larger Pittsburgh community. CaPS also provides workshops and group sessions on mental health related topics specifically for graduate students on campus. CaPS services are provided at no cost. Appointments can be made in person, or by telephone at 412-268-2922.

Health Services

https://www.cmu.edu/HealthServices/

University Health Services (UHS) is staffed by physicians, advanced practice clinicians and registered nurses who provide general medical care, allergy injections, first aid, gynecological care, and contraception as well as on-site pharmaceuticals. The CMU Student Insurance Plan covers most visit fees to see the physicians and advanced practice clinicians & nurse visits. Fees for prescription medications, laboratory tests, diagnostic procedures and referral to the emergency room or specialists are the student's responsibility and students should review the UHS website and their insurance plan for detailed information about the university health insurance requirement and fees.

UHS also has a registered dietician and health promotion specialists on staff to assist students in addressing nutrition, drug and alcohol and other healthy lifestyle issues. In addition to providing direct health care, UHS administers the Student Health Insurance Program. The Student Health Insurance plan offers a high level of coverage in a wide network of health care providers and hospitals. Appointments can be made by visiting UHS's website, walk-in, or by telephone, 412-268-2157.

Campus Wellness

https://www.cmu.edu/wellness/

At Carnegie Mellon, we believe our individual and collective well-being is rooted in healthy connections to each other and to campus resources. The university provides a wide variety of wellness, mindfulness and connectedness initiatives

and resources designed to help students thrive inside and outside the classroom.

Religious and Spiritual Life Initiatives (RSLI)

`https://www.cmu.edu/wellbeing/resources/religious-spiritual/index.html`

Carnegie Mellon is committed to the holistic growth of our students, including creating opportunities for spiritual and religious practice and exploration. RSLI has relationships with local houses of worship from various traditions and many of these groups are members of CMU's Council of Religious Advisors. They also offer programs and initiatives that cross traditional religious boundaries in order to increase knowledge of and appreciation for the full diversity of the worldview traditions. RSLI staff are available to support students across the spectrum of religious and spiritual practice and would be more than happy to help you make a connection into a community of faith during your time at CMU.

University Police

`https://www.cmu.edu/police/`

`x2323`

The University Police Department is located at 4551 Filmore Street. The department's services include police patrols and call response, criminal investigations, fixed officer and foot officer patrols, event security, and crime prevention and education programming as well as bicycle and laptop registration. Visit the department's website for additional information about the staff, emergency phone locations, crime prevention, lost and found, fingerprint services, and annual statistic reports. Carnegie Mellon University publishes an annual campus security and fire safety report describing the university's security, alcohol and drug, sexual assault, and fire safety policies. The report also contains statistics about the number and type of crimes committed on the campus and the number and cause of fires in campus residence facilities during the preceding three years. Graduate students can obtain a copy by contacting the University Police Department at x2323. The annual security and fire safety report is also available online at:

`https://www.cmu.edu/police/annualreports/`

Shuttle and Escort Services

`https://www.cmu.edu/parking/transport/`

Parking and Transportation coordinates the Shuttle Service and Escort Service

provided for CMU students, faculty, and community. The Shuttle & Escort website has full information about these services, stops, routes, tracking and schedules.